

#### ABSTRACT OF THE DISCLOSURE

In detecting a deterioration of an air-fuel ratio sensor, a sensor output change speed integrated value is calculated when an element temperature of a solid electrolyte is stabilized at a low temperature. Successively, a sensor output change speed integrated value is calculated when the solid electrolyte element is stabilized at a high temperature. Finally, a deviation between the change speed integrated values is calculated. By comparing the deviation amount with a predetermined determinant, presence or absence of the deterioration is determined.